PATENT ABSTRACTS OF JAPAN

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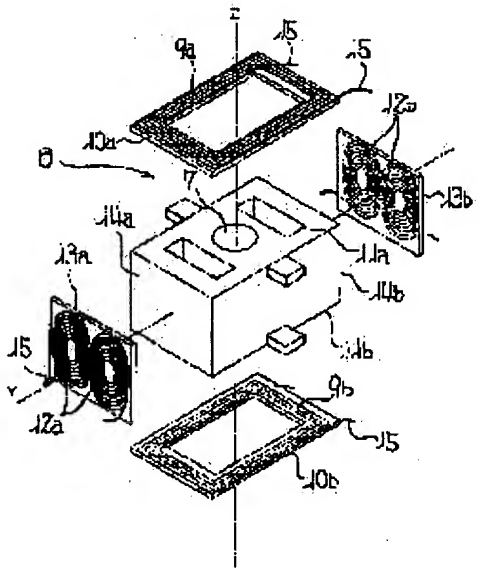
(54) OBJECTIVE LENS DRIVING DEVICE

(57)Abstract:

PURPOSE: To enhance working efficiency and to reduce a production cost by molding coils for focusing substrates A and coils for tracking on substrates B, mounting the substrates A, B to a moving body and omitting the operations of winding coils on this moving body.

CONSTITUTION: The moving body 8 which holds an objective lens 7 for irradiation of an optical information recording medium with a laser beam at the center is supported by means of a leaf spring to a fixing body having a magnetic circuit consisting of a magnet and yoke movably vertically. The coils 9a, 9b are provided on the substrates 10a, 10b for focusing and the coils 12a, 12b are provided on the substrates 13a, 13b for tracking. Plastic plates, etc., are used for the respective substrates 10a, 10b, 13a 13b and the respective coils are formed of printed wirings, etc. The substrates 10a, 10b are mounted to the front and rear surfaces 11a, 11b on the moving body 8 and the substrates 13a, 13b are mounted to the flanks 14a, 14b. As a result, the operations for winding the coils on the moving body 8 are omitted. The working efficiency is thus enhanced and the product cost is reduced.



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CLAIMS

[Claim(s)]
[Claim 1] The movable object holding the objective lens which makes a laser beam irradiate an optical information record medium, The coil for focuses which makes this movable object drive in the direction of a focus, and the coil for tracking which makes said good dynamic body drive in the direction of a truck, In the objective lens driving gear equipped with the fixed object which has the magnetic circuit formed from a magnet and York The objective lens driving gear characterized by attaching in said good dynamic body the base for focuses and the base for tracking at which said coil for focuses was fabricated on the base for focuses, said coil for tracking was fabricated on the base for tracking, and these coils were fabricated.
[Claim 2] The objective lens driving gear characterized by consisting of a movable object holding the objective lens which makes a laser beam irradiate an optical information record medium by combining the base for focuses at which the coil for focuses was fabricated, and the base for tracking at which the coil for tracking was fabricated, and a fixed object which has the magnetic circuit formed from a magnet and York.
[Claim 3] The coil for focuses and the coil for tracking are an objective lens driving gear according to claim 1 or 2 characterized by being fabricated by etching the base for focuses, and base side top for tracking, respectively.
[Claim 4] The objective lens driving gear characterized by consisting of the coil for focuses fabricated by etching into an optical information record medium directly the whole surface of the movable object holding the objective lens which a laser beam is made to irradiate, and this movable object, a coil for tracking fabricated by etching the other sides of said good dynamic body directly, and a fixed object which has the magnetic circuit formed from a magnet and York.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the objective lens driving gear equipped with the focal controlling mechanism and tracking controlling mechanism in an optical information record regenerative apparatus.
[0002]
[Description of the Prior Art] It consists of a support device using the flat spring to which the variation rate of the objective lens held at the movable object is made to carry out in the direction of a truck used as the direction of a focus which becomes perpendicular to an optical information record medium, and radial as an objective lens driving gear equipped with the focal controlling mechanism and tracking controlling mechanism in the former, and a drive which makes a movable object drive using a coil or a magnet.
[0003] There are some which are indicated as a concrete example of a configuration by the name which "objective-lens driving gear" Becomes JP,4-121824,A. As this shows drawing 7 , the objective lens 1 is held in the center section of the bobbin 2 (movable object), and the coil 3 for focuses is wound around the perimeter side face of this bobbin 2. In the side face of a bobbin 2 in which this coil 3 for focuses was wound, it has fixed in the condition of having been positioned with the fixture which the coil 4 for tracking currently wound beforehand does not illustrate. Thus, the bobbin 2 equipped with the coil 3 for focuses and the coil 4 for tracking is being fixed to the holder 6 (fixed object) in the movable free condition through the support arm 5 of the every two upper and lower sides. By passing the current for a drive in the coil 3 for focuses, and the coil 4 for tracking, the variation rate of the objective lens can be made to be able to carry out in the direction X of tracking used as the direction Z of a focus which becomes perpendicular to an optical information record medium, and radial, and, thereby, focal control of an objective lens and tracking control can be performed.
[0004]
[Problem(s) to be Solved by the Invention] In the conventional objective lens driving gear which was mentioned above, after twisting and installing the coil 3 for focuses in the movable object (bobbin 2) side holding an objective lens 1, the activity which installs the coil 4 for tracking rolled further beforehand by adhesion is made. When coils 3 and 4 were not correctly attached in the position and a current is passed in coils 3 and 4, it will become impossible in this case, for an objective lens 1 to move in the exact direction. In order that the operator who became skillful using the highly precise fixture may generally do these activities, it cannot automate, for this reason, productivity seldom goes up, but there is a problem of becoming cost quantity.
[0005]
[Means for Solving the Problem] The movable object which holds the objective lens which makes a laser beam irradiate an optical information record medium in invention according to claim 1, The coil for focuses which makes this movable object drive in the direction of a focus, and the coil for tracking which makes said good dynamic body drive in the direction of a truck, In the objective lens driving gear

equipped with the fixed object which has the magnetic circuit formed from a magnet and York The base for focuses and the base for tracking at which said coil for focuses was fabricated on the base for focuses, said coil for tracking was fabricated on the base for tracking, and these coils were fabricated were attached in said good dynamic body.

[0006] Invention according to claim 2 constituted from the movable object holding the objective lens which makes a laser beam irradiate an optical information record medium, and the fixed object which has the magnetic circuit formed from a magnet and York by combining the base for focuses at which the coil for focuses was fabricated, and the base for tracking at which the coil for tracking was fabricated.

[0007] In invention according to claim 1 or 2, the coil for focuses and the coil for tracking were fabricated in invention according to claim 3 by etching on the base for focuses, and the base side for tracking, respectively.

[0008] It constituted from a coil for focuses fabricated in invention according to claim 4 by etching into an optical information record medium directly the whole surface of the movable object holding the objective lens which a laser beam is made to irradiate, and this movable object, a coil for tracking fabricated by etching the other sides of said good dynamic body directly, and a fixed object which has the magnetic circuit formed from a magnet and York.

[0009]

[Function] In invention according to claim 1, it becomes possible to make the activity which twists a coil on the movable object holding a coil omit by attaching in the movable object holding an objective lens the coil fabricated on the base, respectively.

[0010] It becomes possible for creation of the movable object of dedication for it to become possible to make the activity which twists a coil around the movable object which holds a coil by constituting the movable object which holds an objective lens in invention according to claim 2 combining the base at which the coil was fabricated, respectively omit, and for this hold an objective lens to become unnecessary, and to make components mark reduce.

[0011] In invention according to claim 3, it becomes possible by fabricating the coil on each base by etching to make the activity which rolls a coil omit.

[0012] In invention according to claim 4, it becomes possible by etching directly on the movable object holding an objective lens, and fabricating each coil to make the activity which twists a coil on the movable object holding an objective lens omit.

[0013]

[Example] One example of invention according to claim 1 is explained based on drawing 1 . Drawing 1 shows the configuration of an objective lens driving gear. Fixed maintenance of the objective lens 7 for making a laser beam irradiate the optical information record medium which is not illustrated is carried out in the center section of the movable object 8. Moreover, the coils 9a and 9b for focuses are fabricated on base 10for focuses a, and 10b. Specifically, it constitutes by wiring the lead wire as coils 9a and 9b for focuses on such a plate surface (winding), using plastic sheets (or metal plate etc.) as bases 10a and 10b for focuses. Thus, it fixes to the vertical sides 11a and 11b located in the vertical direction (Z direction) of the movable object 8, respectively, and the coils 9a and 9b for focuses fabricated on base 10for focuses a and 10b are attached in them.

[0014] On the other hand, the coils 12a and 12b for tracking are fabricated on base 13for tracking a, and 13b. Also in this case, it constitutes by wiring the lead wire as coils 12a and 12b for tracking on such a plate surface (winding), using plastic sheets (or metal plate etc.) as bases 13a and 13b for tracking. Thus, it fixes on the side faces 14a and 14b of the longitudinal direction (the direction of Y) of the movable object 8, respectively, and the coils 12a and 12b for tracking fabricated on base 13for tracking a and 13b are attached in them. In addition, from the coils 9a and 9b for focuses, and the coils 12a and 12b for tracking, the end-winding child 15 is pulled out, respectively. And the configuration of the movable object 8 with which it did in this way and the coils 9a and 9b for focuses and the coils 12a and 12b for tracking were attached serves as a configuration as shown in drawing 2 .

[0015] In addition, explanation here is omitted although the fixed object which has the flat spring which is connected to the height 16 of the movable object 8, and which is not illustrated and the magnetic

circuit which consisted of the magnets and York which are connected the other end side of this flat spring, and which are not illustrated exists in this equipment.
[0016] In such a configuration, the focal control and tracking control which can be made to carry out a variation rate to a perpendicular direction (Z direction) or radial (the direction of X) to the optical disk side as an optical information record medium which does not illustrate an objective lens 7, and are considered as a request by this can be performed by passing a current from each end-winding child 15 of the coils 9a and 9b for focuses, and the coils 12a and 12b for tracking.
[0017] As mentioned above, the coils 12a and 12b for tracking fabricated on the coils 9a and 9b for focuses fabricated on base 10for focuses a, and 10b and base 13for tracking a, and 13b Since the activity which twists the coil 3 for focuses directly on a bobbin 2 like the conventional technique (refer to drawing 7) by attaching in the movable object 8 holding an objective lens 7, respectively can be made to omit, working efficiency can be raised. And thereby, since an assembly can be performed easily, reduction of a production cost can be aimed at.
[0018] Next, one example of invention according to claim 3 is described. In addition, the explanation about the same part as invention according to claim 1 mentioned above is omitted, and uses the same sign about the same part.
[0019] Here, in drawing 1 mentioned above and an objective lens driving gear according to claim 1 which was stated by drawing 2 , the coils 9a and 9b for focuses and the coils 12a and 12b for tracking are fabricated by etching the bases 10a and 10b for focuses, and the bases 13a and 13b for tracking, respectively.
[0020] Where a spiral paper pattern is laid so that a metal with little copper electric resistance may be stuck on the base side which consists of a plastics metallurgy group, a chemical may be applied on the copper plate formed by this as the example and it may become the configuration of a coil The coils 9a and 9b for focuses and the coils 12a and 12b for tracking of a configuration which are considered as a request and which were wound can be created by exposing using beams of light, such as ultraviolet rays, from a way, and besides, carrying out etching processing after that.
[0021] Since the activity which rolls a coil on a base like invention according to claim 1 by fabricating the coils 9a and 9b for focuses and the coils 12a and 12b for tracking directly by etching, respectively on the bases 10a and 10b for focuses, base 13for tracking a, and 13 b-th page can be made to omit as mentioned above, working efficiency can be raised much more. And since assembly can carry out still more easily by this, a production cost can be reduced much more.
[0022] Next, one example of invention according to claim 4 is described based on drawing 3 and drawing 4 . In addition, invention of claim 1 and three publications which were mentioned above, and the explanation about the same part are omitted, and use the same sign about the same part.
[0023] Here, as shown in drawing 3 , the coils 12a and 12b for tracking are fabricated by fabricating the coils 9a and 9b for focuses, and etching the side faces 14a and 14b of the movable object 8 directly by etching the vertical sides 11a and 11b of the movable object 8 directly. This becomes the form where the coils 9a and 9b for focuses and the coils 12a and 12b for tracking were directly stuck on the field of the movable object 8, without minding bases 10a and 10b for focuses like the example mentioned above, and the bases 13a and 13b for tracking, as shown in drawing 4 .
[0024] As the example, on the vertical sides 11a and 11b of the movable object 8 holding an objective lens 7, and the field of side faces 14a and 14b Where a spiral paper pattern is laid so that a chemical may be applied on direct attachment and the copper plate formed by this and it may become the configuration of a coil about a metal with little copper electric resistance The coils 9a and 9b for focuses and the coils 12a and 12b for tracking of a configuration which are considered as a request and which were wound can be created by exposing using beams of light, such as ultraviolet rays, from a way, and besides, carrying out etching processing after that.
[0025] By etching the field top of the movable object 8 holding an objective lens 7 directly, and fabricating the coils 9a and 9b for focuses, and the coils 12a and 12b for tracking directly on the field, as mentioned above Since the activity which twists a coil on a base like invention according to claim 1, and the activity which etches by establishing a base separately like invention according to claim 3 can be

made to omit, working efficiency can be raised much more. And since assembly can carry out still more easily by this, a production cost can be reduced much more.
[0026] Next, one example of invention according to claim 2 is described based on drawing 5 and drawing 6 . In addition, invention of claims 1 and 3 and four publications which were mentioned above, and the explanation about the same part are omitted, and use the same sign about the same part.
[0027] As shown in drawing 5 , the bases 17a and 17b for focuses at which the coils 9a and 9b for focuses were fabricated are arranged at the up-and-down Z direction. In the direction on either side of Y, the bases 18a and 18b for tracking at which the coils 12a and 12b for tracking were fabricated are arranged. Moreover, the opening 19 to settle an objective lens 7, the magnet which is not illustrated, and York is formed in the center section, and the height 16 for attaching the flat spring which is not illustrated to the lateral portion is formed in the bases 17a and 17b for focuses. Furthermore, beveling is made by each four side of the bases 17a and 17b for focuses, and the bases 18a and 18b for tracking at the include angle of 45 degrees.
[0028] The movable object 20 holding the objective lens 7 as shown in drawing 6 consists of this examples by combining the bases 17a and 17b for focuses which have such coils 9a and 9b for focuses, and the bases 18a and 18b for tracking which have the coils 12a and 12b for tracking.
[0029] On the bases 17a and 17b for focuses here the coils 9a and 9b for focuses As an approach of fabricating the coils 12a and 12b for tracking on the bases 18a and 18b for tracking, respectively You may make it fabricate a coil by etching a base side top, as invention according to claim 3 which twisted the coil on the base side or was mentioned above as invention according to claim 1 mentioned above described described.
[0030] or [twisting lead wire as the example on the base side which consists of a plastics metallurgy group] -- or Where a spiral paper pattern is laid so that a metal with little copper electric resistance may be applied on the base side which consists of such a plastics metallurgy group, a chemical may be applied on direct attachment and the copper plate formed by this and it may become the configuration of a coil The coils 9a and 9b for focuses and the coils 12a and 12b for tracking of a configuration which are considered as a request and which were wound can be created by exposing using beams of light, such as ultraviolet rays, from a way, and besides, carrying out etching processing after that.
[0031] The bases 17a and 17b for focuses at which the coils 9a and 9b for focuses were fabricated as mentioned above, By constituting the movable object 20 which holds an objective lens 7 combining the bases 18a and 18b for tracking at which the coils 12a and 12b for tracking were fabricated Since the activity which twists a coil around a movable object like invention according to claim 1 mentioned above can be made to omit, working efficiency can be raised much more. And since creation of the movable object of the dedication for holding an objective lens in this case becomes unnecessary, components mark can be made to be able to reduce and a production cost can be reduced much more.
[0032]
[Effect of the Invention] The movable object holding the objective lens with which invention according to claim 1 makes a laser beam irradiate an optical information record medium, The coil for focuses which makes this movable object drive in the direction of a focus, and the coil for tracking which makes said good dynamic body drive in the direction of a truck, In the objective lens driving gear equipped with the fixed object which has the magnetic circuit formed from a magnet and York Since the base for focuses and the base for tracking at which said coil for focuses was fabricated on the base for focuses, said coil for tracking was fabricated on the base for tracking, and these coils were fabricated were attached in said good dynamic body Since working efficiency can be raised since the activity which twists a coil on the movable object holding a coil can be made to omit, and an assembly can carry out easily, a production cost can be reduced.
[0033] The movable object holding the objective lens which makes a laser beam irradiate an optical information record medium when invention according to claim 2 combines the base for focuses at which the coil for focuses was fabricated, and the base for tracking at which the coil for tracking was fabricated, Since it constituted from a fixed object which has the magnetic circuit formed from a magnet and York Since the activity which twists a coil around the movable object holding a coil can be made to

omit, working efficiency can be raised. Moreover, since creation of the movable object of the dedication for holding an objective lens becomes unnecessary, components mark can be made to be able to reduce, and lightweight-izing and reduction-ization of a production cost can be attained much more.

[0034] Since invention according to claim 3 fabricated the coil for focuses, and the coil for tracking in invention according to claim 1 or 2 by etching on the base for focuses, and the base side for tracking, respectively Since working efficiency can be raised much more since the activity which twists a coil on the movable object holding a coil can be made to omit, and an assembly can carry out easily, a production cost can be reduced much more.

[0035] The movable object holding the objective lens with which invention according to claim 4 makes a laser beam irradiate an optical information record medium, The coil for focuses fabricated by etching the whole surface of this movable object directly, Since it constituted from a coil for tracking fabricated by etching the other sides of said good dynamic body directly, and a fixed object which has the magnetic circuit formed from a magnet and York Since working efficiency can be raised much more since the activity which twists a coil on the movable object holding a coil can be made to omit, and an assembly can carry out easily, a production cost can be reduced much more.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the decomposition perspective view showing the configuration of the movable object in the objective lens driving gear which is one example of invention according to claim 1.
[Drawing 2] It is the perspective view showing the configuration after assembly of a movable object.
[Drawing 3] It is the perspective view showing the configuration of the movable object before fabricating the coil which is one example of invention according to claim 4.
[Drawing 4] It is the perspective view showing the configuration of the movable object after fabricating a coil.
[Drawing 5] It is the decomposition perspective view showing the configuration of the movable object in the objective lens driving gear which is one example of invention according to claim 2.
[Drawing 6] It is the perspective view showing the configuration after assembly of a movable object.
[Drawing 7] It is the decomposition perspective view showing the example of a configuration of the conventional movable object.
[Description of Notations]
7 Objective Lens
8 Movable Object
9a, 9b Coil for focuses
10a, 10b Base for focuses
12a, 12b Coil for tracking
13a, 13b Base for tracking
17a, 17b Base for focuses
18a, 18b Base for tracking
20 Movable Object

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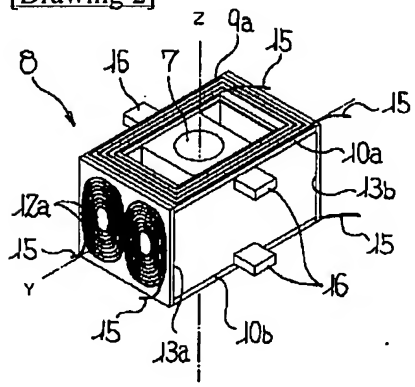
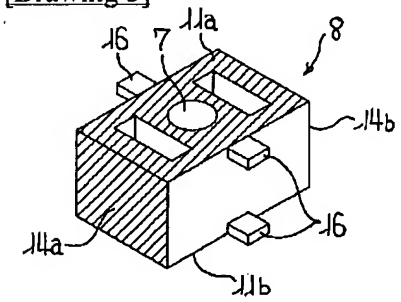
DRAWINGS

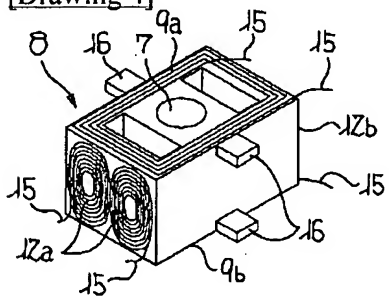
[Drawing 2]



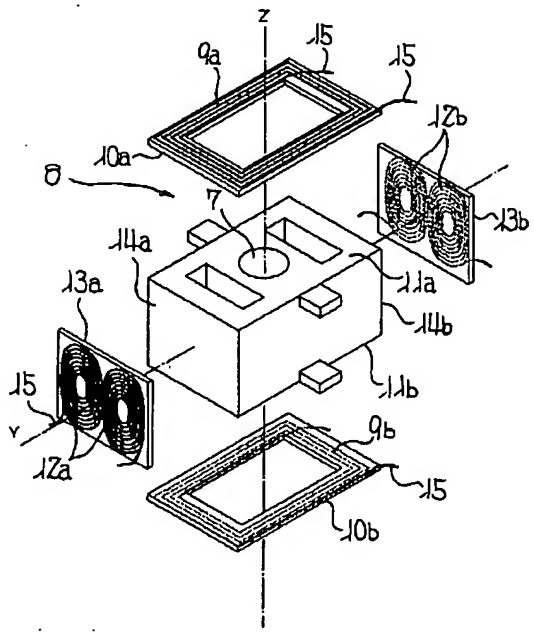
[Drawing 3]



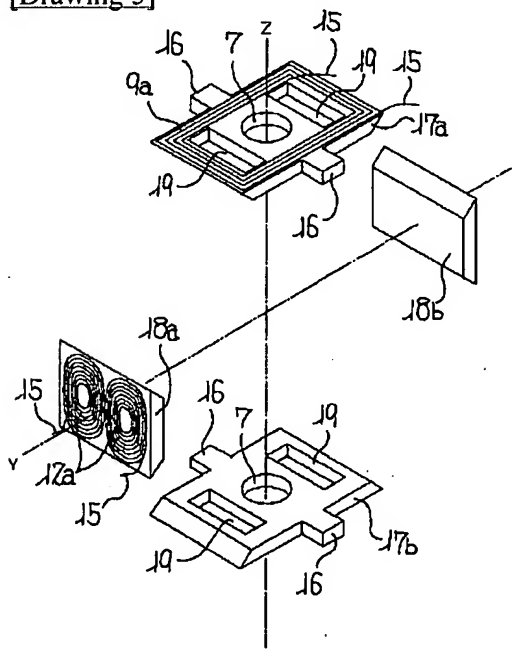
[Drawing 4]



[Drawing 1]



[Drawing 5]



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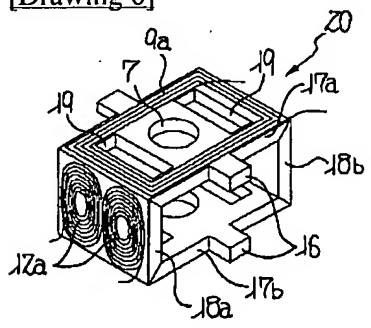
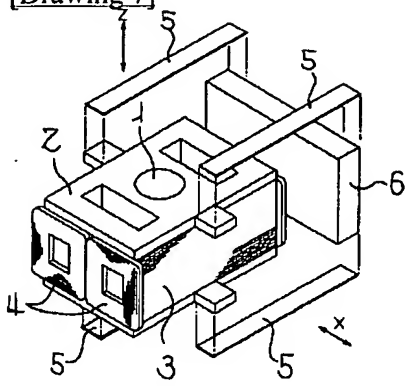


[Drawing 7]



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